State of Ohio Monthly Climate Update

THE OHIO STATE UNIVERSITY

Review – November 2022

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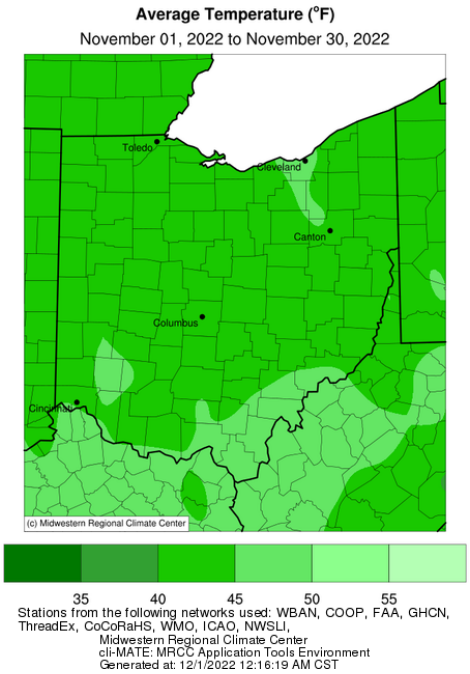

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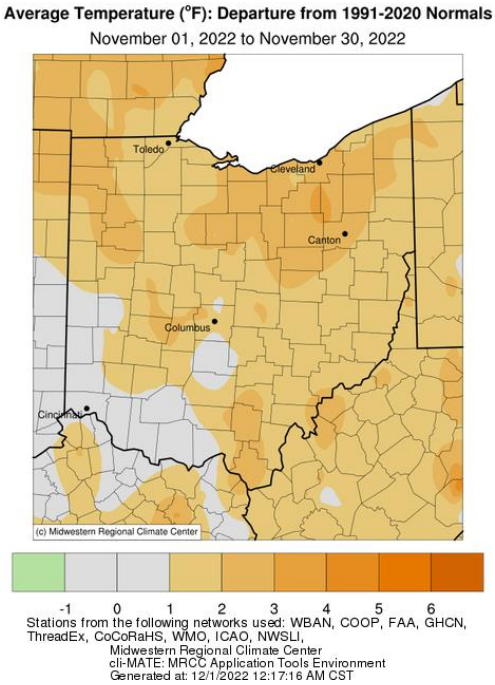


Figure 1a: Average temperature and 1b: Departure from Normal for the month of November 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Temperature

Temperatures this November can be defined by their variability, as Ohio saw extremes in both directions throughout the month. After beginning with temperatures well above normal, the month's second week saw a broad area of high pressure extend over the United States, exposing the entire state to frigid conditions for more than a week. With the system's retreat just before Thanksgiving, Ohio returned to just above-normal temperatures for the remainder of the month. Altogether, these fluctuations nearly canceled each other out, with most of Ohio seeing averages of around 40-45°F, constituting temperatures only 1-2°F above normal everywhere in the state except the southwest, which stayed within a degree of normal (Figs. 1a and 1b). With consistent departures from the normal, every county in Ohio ranked within the warmest third of their historical record (Fig. 2).

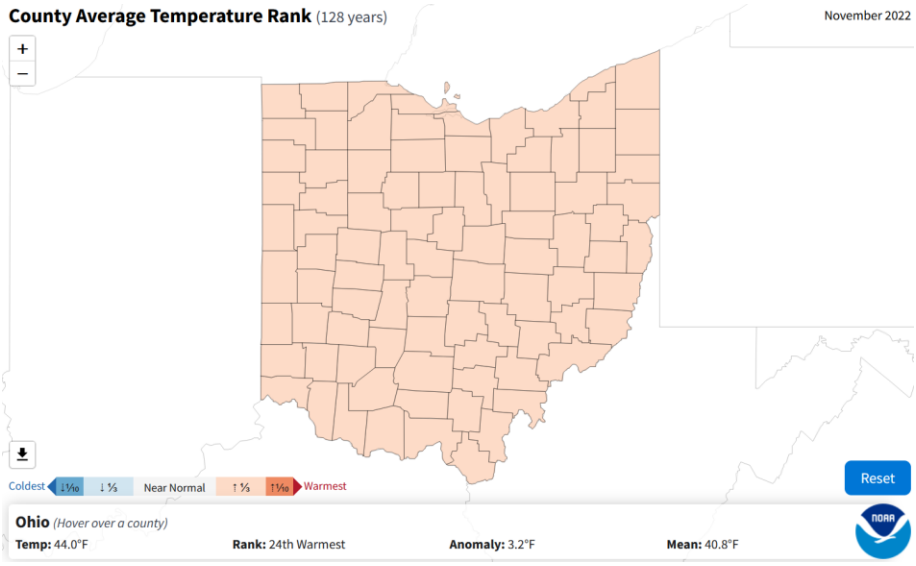
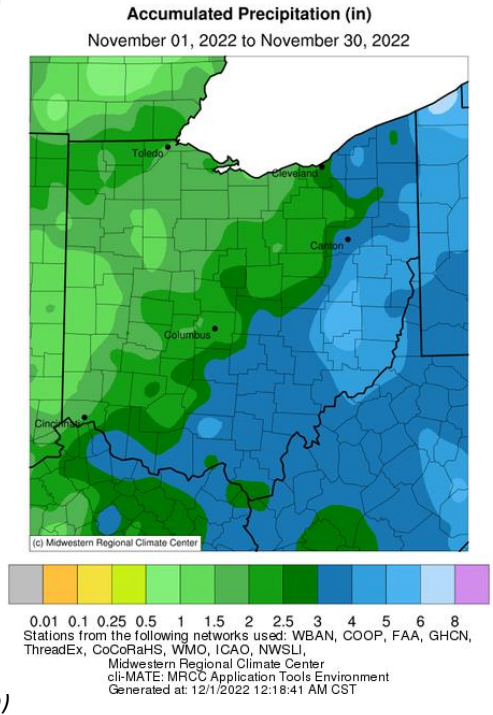


Figure 2: State of Ohio average temperature ranks by county for November 2022. Courtesy of the National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/).

a)



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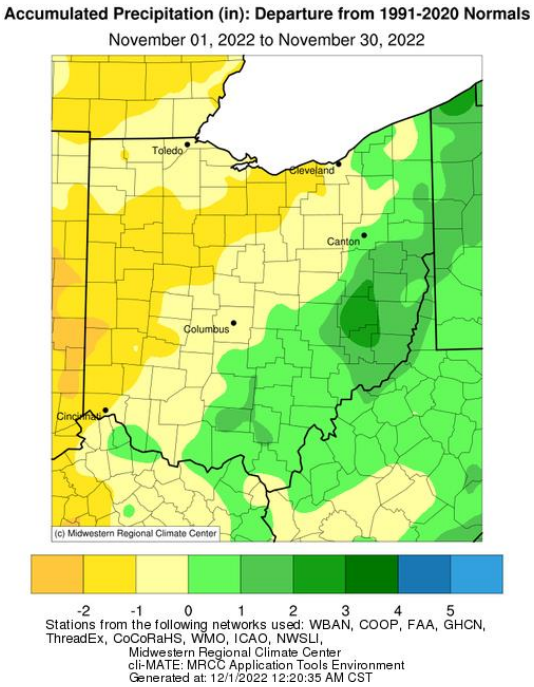


Figure 3a: Accumulated precipitation and 3b: Departures from Normal for the month of November 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Precipitation

While November saw more overall precipitation than the previous month, the western half of the state still fell short of historical normals. Remnants of Hurricane Nicole passing near Veterans Day provided the bulk of the Ohio's precipitation for the month, with the eastern portion seeing the greatest accumulation from the event. This, along with the passage of a low-pressure system near the end of the month, made up the only major precipitation events to impact Ohio in November, resulting in 3-6 inches in the southeast versus only 0.5-2 inches in the northwest (Fig. 3a). With that, precipitation totals 1-2 inches below normal were generally observed in the north and west, while the southeast saw up to 2 inches above normal (Fig. 3b). Unequal accumulation is clear at the county level, with the northwest mostly in the drier third and southeast in the wetter third of their record (Fig. 4).

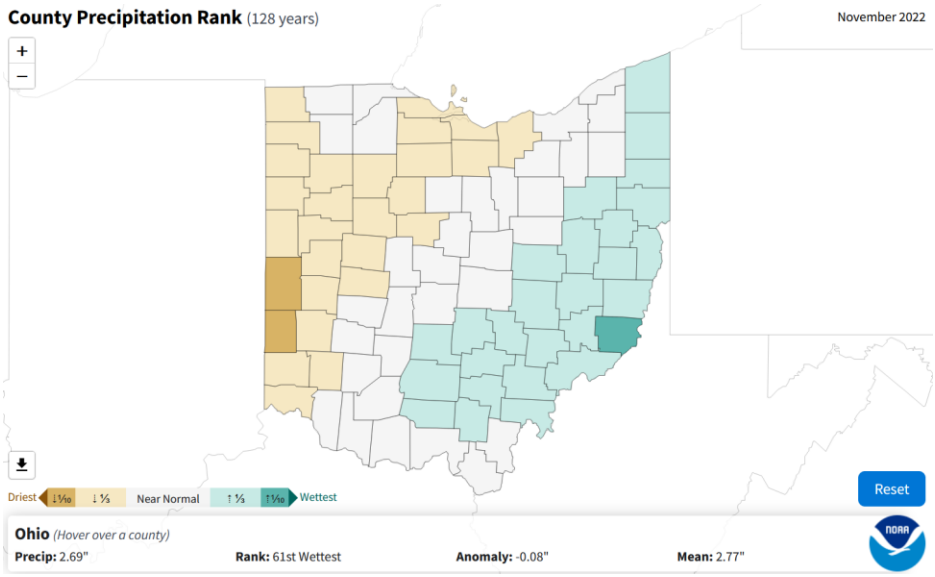
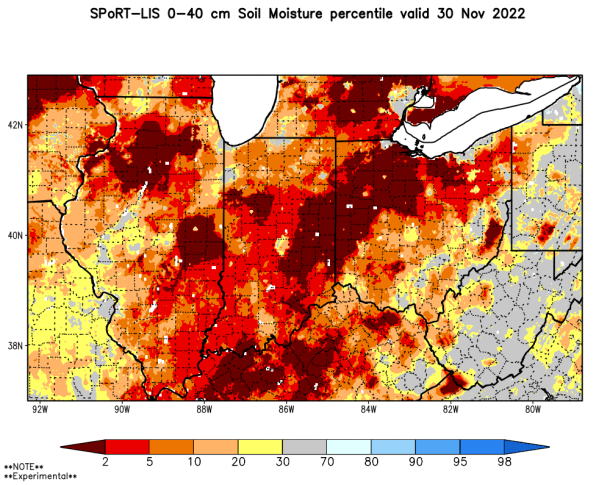


Figure 4: State of Ohio precipitation ranks by county for November 2022. Courtesy of the National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/).

a)



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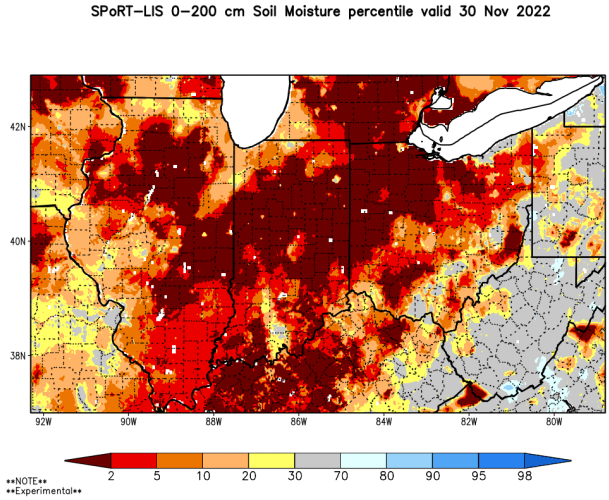

Soil and Energy

Precipitation events in November split Ohio into two parts, with the southeast's above-average rain accumulation leading to improvements in soil moisture. At the same time, Hurricane Nicole's remnants avoiding the state's northwest resulted in sustained dry conditions at both 40cm (Fig. 5a) and 200cm (Fig. 5b) levels at the end of the month. While this dryness aided in the harvest of the few crops still in season at the start of November, it also resulted in below-normal stream flows throughout northwest Ohio. As the region continued to experience moderate drought, some stresses on year-round vegetation remained.

Despite warmer-than-average temperatures at the start of November, Ohio stayed true to normal for this time of year, seeing barely any cooling degree days (CDDs) in the month. Warm conditions did leave their mark, though, as the state saw fewer heating degree days (HDDs) than normal in every climate division, with the most pronounced departures in the north (Fig. 6).

Figure 5a: 0-40 cm and 5b: 0-200 cm soil moisture percentile across the region at the end of November. Courtesy of NASA SPoRTLIS (https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html).

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	672	773	-61	0	0	0
2	641	708	-68	1	0	1
3	654	722	-69	1	0	1
4	662	700	-38	0	0	0
5	650	683	-33	0	0	0
6	640	716	-77	0	0	0
7	626	695	-69	0	0	0
8	649	660	-12	0	0	0
9	594	637	-44	0	0	0
10	618	672	-54	0	0	0
Statewide	641	691	-50	0	0	0

Figure 6: (Left) November 2022 heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions. Data courtesy of the Midwestern Regional Climate Center (http://purdue.mrcc.edu).

Notable Events

With few large-scale precipitation events in November, the passage of Hurricane Nicole's remnants near Veterans Day stood out as the month's most notable development in Ohio. After making landfall in Florida on November 10th, the storm quickly travelled along the Appalachian Mountains, sideswiping southern and eastern Ohio and dumping up to three inches of precipitation from November 10th to 14th (Fig. 7), before finally dissipating over the East Coast.

The simultaneous arrival of a polar airmass to the state on November 12th thanks to a trailing cold front dropped temperatures below freezing for portions of western Ohio (Fig. 8a), resulting in up to two inches of accumulated snowfall along the fringes of Nicole's impacted areas (Fig. 8b). In addition, lake effect snow showers coming from Lake Erie caused comparable two-inch snow totals in northeast Ohio.

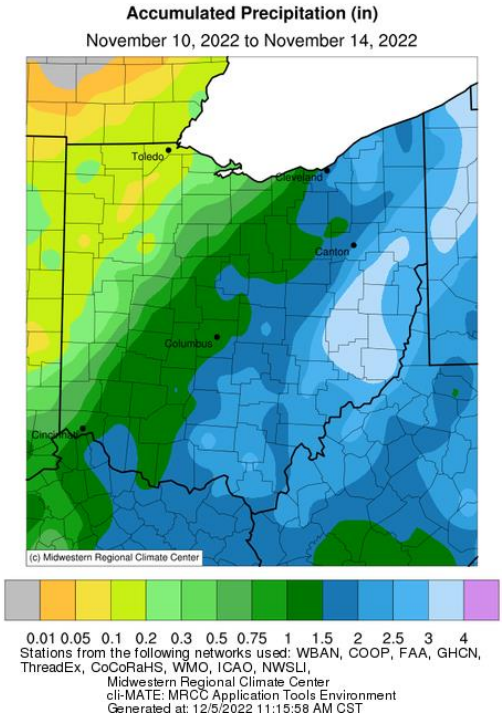

Figure 7: Accumulated precipitation across Ohio on November 10th-14th, 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

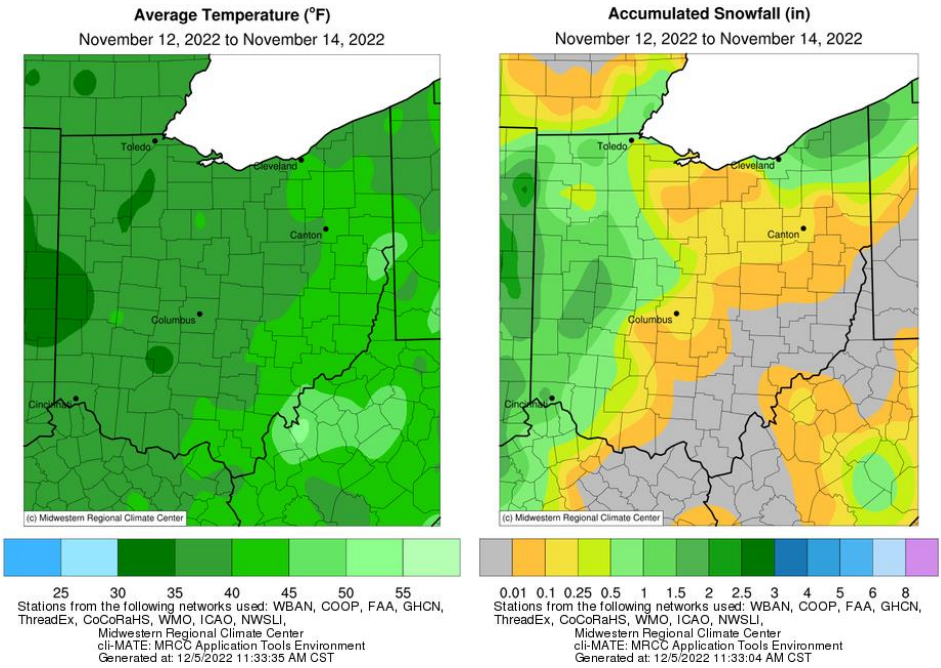

Figure 8a: Average Temperature (left) and 8b: Accumulated snowfall (right) across Ohio on November 12th-14th, 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

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Forecast: Dec 2022 - Feb 2023

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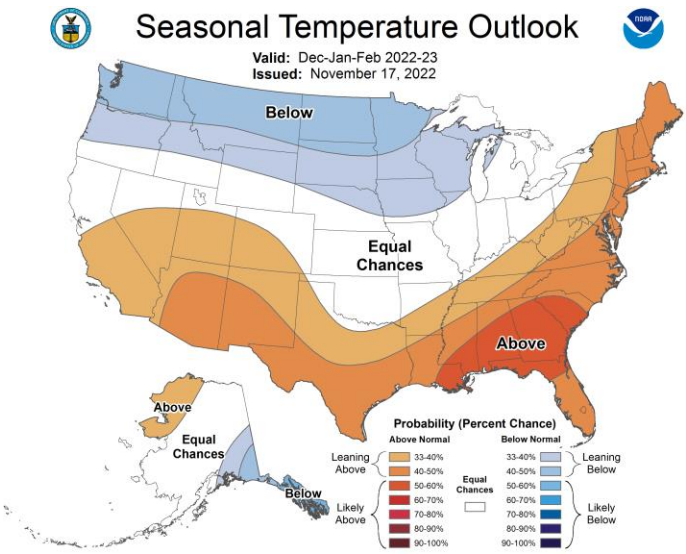

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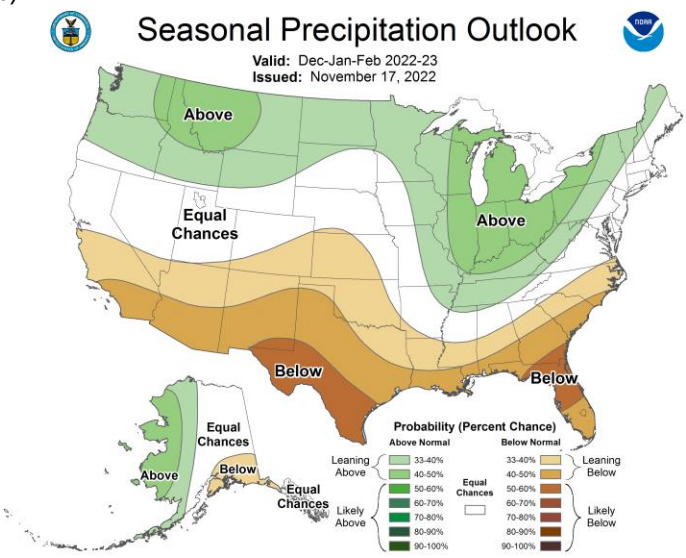

Figure 9a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for December-February. Courtesy of the Climate Prediction Center (https://www.cpc.ncep.noaa.gov/).

Looking Ahead

The Climate Prediction Center's 3-month outlook implies a reversal in precipitation trends for Ohio, with an inclination towards higher chances of above-normal precipitation through the beginning of 2023 (Fig. 9b). With this turnaround, the CPC is also predicting a gradual reduction of drought conditions in the state over the next three months. As for temperature, uncertainty remains with equal chances for the occurrence of both above- and below-normal temperatures for the state, with a small section near the Ohio River having a slightly increased likelihood of above-average conditions (Fig. 9a).

These shifts in outlook are indicative of the La Niña pattern previously forecasted for the season, which generally brings about cold temperatures in the northern United States, warmth in the south, and wet conditions in the northwest and Ohio River valley.

Note: these outlooks do not provide the quantity of above or below normal conditions, just the likelihood of occurrence (i.e., the probability).

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